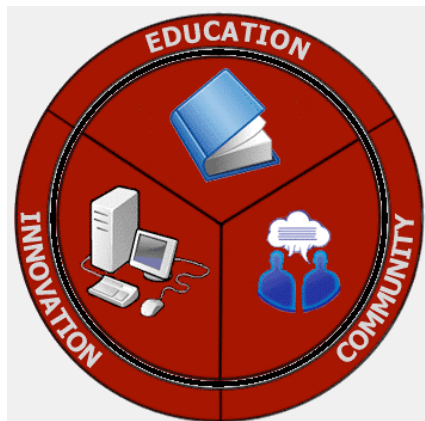


FAST TIMES HIGH SCHOOL
SPH3U: GRADE 11 UNIVERSITY PHYSICS
FINAL EXAM - SEMESTER 2



FRIDAY MARCH 19, 2010
1:00 – 2:30 PM (1.5 HOURS)

NAME: _____

TEACHER: Mr. Webb

INCLUDING THIS PAGE, THIS EXAM HAS **9** PAGES. PLEASE CHECK YOUR PAPERS.
THE BREAKDOWN OF THE EXAM IS AS FOLLOWS:

SECTION	QUESTION TYPE(S)	MARKS	SUGGESTED MAXIMUM TIMES PER SECTION (INLCUDES REVIEW)
A: Multiple Choice	5 questions T & I and K & U	8	20 minutes
B: Extended Answer	5 questions T & I, APP	30	70 minutes
Communication (COM) (Part B - 1, 2, 3, 5) ½ mark deducted per formula omission, final unit omission or incorrect final sd up to a maximum of 1 mark per question.		4	N/A
Totals		42 marks	90 minutes / 1.5 hours

Formative (70%)	Summative Projects (10%)	Summative Exam (20%)	Reported Final % (after bonuses and round ups)
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STUDENTS ARE PERMITTED:

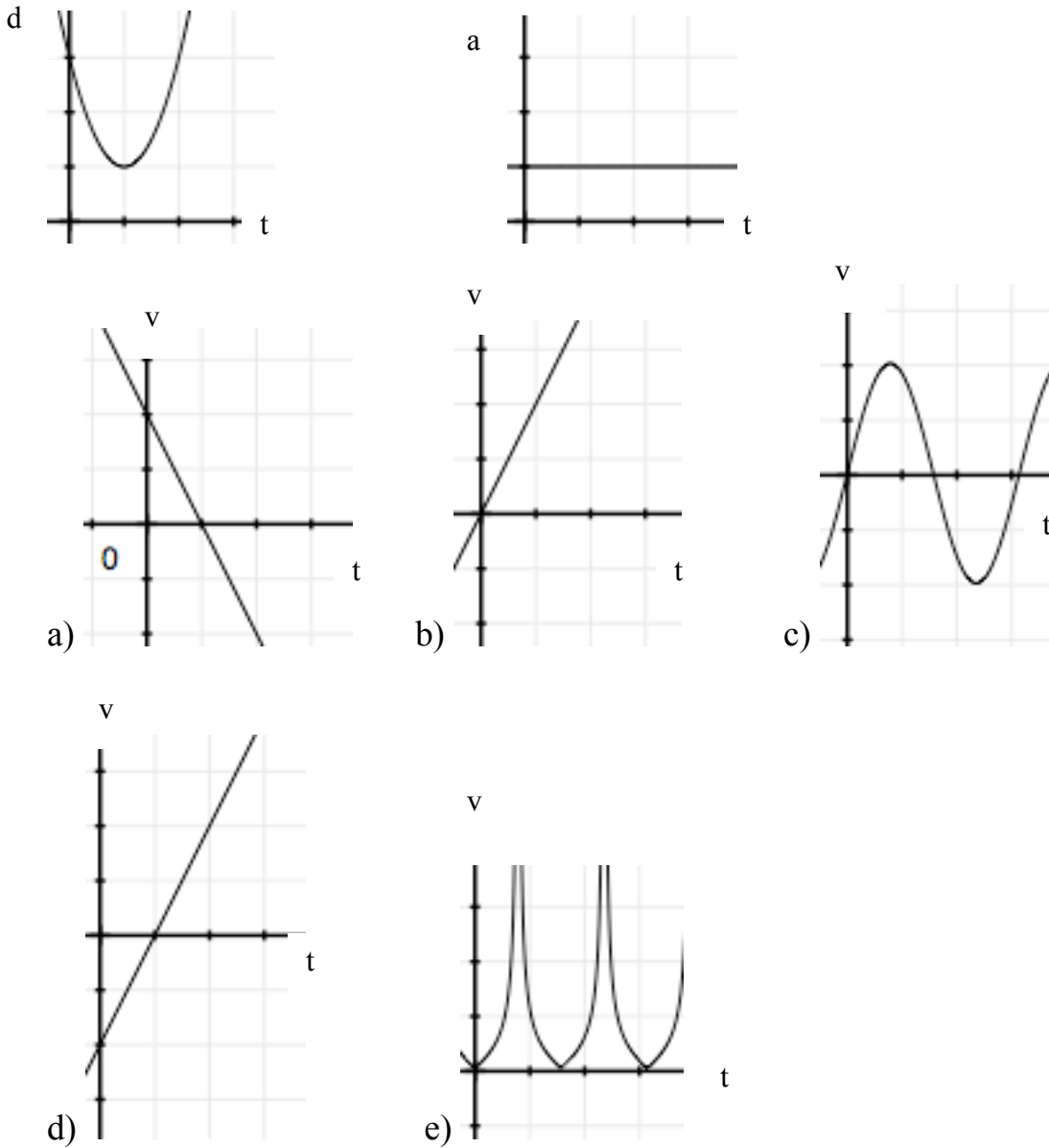
Calculator, Handwritten Approved Formula Sheet

All answers are to appear on the test paper in the spaces provided.

PART A: MULTIPLE CHOICE

Select the best answer for the problem.

1. Given the following displacement-time graph and acceleration-time graph, select the appropriate velocity-time graph for this scenario: (1)



2. Choose the combination of statements that best describes Newton's laws of motion. (1)

	First Law	Second Law	Third Law
a)	If the net force acting on a non-moving object is zero, the object will maintain its state of rest.	The net force acting on an object is equal to its mass and acceleration.	Every action has a reaction equal in magnitude and opposite in direction.
b)	Momentum is independent of friction.	The force due to gravity is 9.8 m/s^2 .	The reaction to an action has an opposite magnitude in an equal direction.
c)	An object in motion will stay in motion unless an outside force acts upon it.	A body will accelerate with an acceleration proportional to the force and inversely proportional to the mass.	Whenever one object exerts a force on a second object, the second exerts an equal and opposite force on the first.
d)	Objects in motion will slow down slowly until they stop.	"The Force" is only practical in space due to the lack of gravity.	Reaction force does not apply to objects in motion.
e)	An object in motion has a net force of zero acting upon it.	An object will accelerate in the direction of a net external force acting upon it.	For every action force, there is a reaction force equal in magnitude, but opposite in direction.

3. A 5.00×10^2 gram piece of silver (specific heat capacity = $2.33 \times 10^2 \text{ J/(kg} \times ^\circ\text{C)}$) at 215°C is submerged in 1.00 litres of water (specific heat capacity = $4.18 \times 10^3 \text{ J/(kg} \times ^\circ\text{C)}$) at 10.0°C (density of water at this temperature is $1.00 \times 10^3 \text{ kg/m}^3$). What is the final temperature of the silver and water. (3)

- a) 2.08°C b) 10.0°C c) 15.6°C d) 54.7°C e) 208°C

4. An organ pipe, 3.6 m long and open at both ends, produces a musical note at its fundamental frequency. What is the frequency of the pipe if the speed of sound in air is 346 m/s? (2)

- a) 3.14 s b) 24 Hz c) 48 Hz d) 96 Hz e) 1245 m

5. Choose the person who discovered the Principle of Electromagnetism and the statement that best describes it. (1)

- a) Oersted - Whenever an electric current moves through a conductor, a magnetic field is created in the region around the conductor.
- b) Picasso - An air current is induced by a conductor whenever she passes through the railcar to collect the passenger's tickets.
- c) Lenz - For a current induced in a coil by a changing magnetic field, the electric current is in such a direction that its own magnetic field opposes the change that produced it.
- d) Faraday - An electric current is induced in a conductor whenever the magnetic field in the region of the conductor changes.
- e) Harper - Whenever an electric current moves through a conductor, it is time to prorogue parliament.

PART B: EXTENDED ANSWER

Give full solutions for each of the following questions in the space provided.

1. Filippo was running late for school one morning. He left his house and began walking at a pace of 2 m/s , which is the speed he walked every other day. After three minutes, he decided that he should speed up to avoid being late – he started to run at a rate of 5 m/s . After another 3 minutes he got tired and slowed his pace to 1 m/s , which he continued for the remainder of his walk to the school. When Filippo arrived at school, he realized that his trip took exactly the same time as it did every other morning. What distance from the school does Filippo live? (6)

2. A person has a reasonable chance of surviving an automobile crash if the force experienced by them is no more than 150 kN. Using an estimate of 140 kg for the mass of the person, what length of “crumple zone” should the automotive engineers design in a car to ensure passengers are safe for collisions up to 130 km/h (assuming constant deceleration)? (4)

3. Daljit and her little brother are tobogganing at a local hill that has a vertical elevation of 22 m. Daljit's brother promises her not to bother her for the rest of the day if she would pull him up the hill on the toboggan. The combined weight of her brother and the sled is 41 kg. The distance along the ground that Daljit pulls her brother is 37 m and she pulls with a force of 2.5×10^2 N.

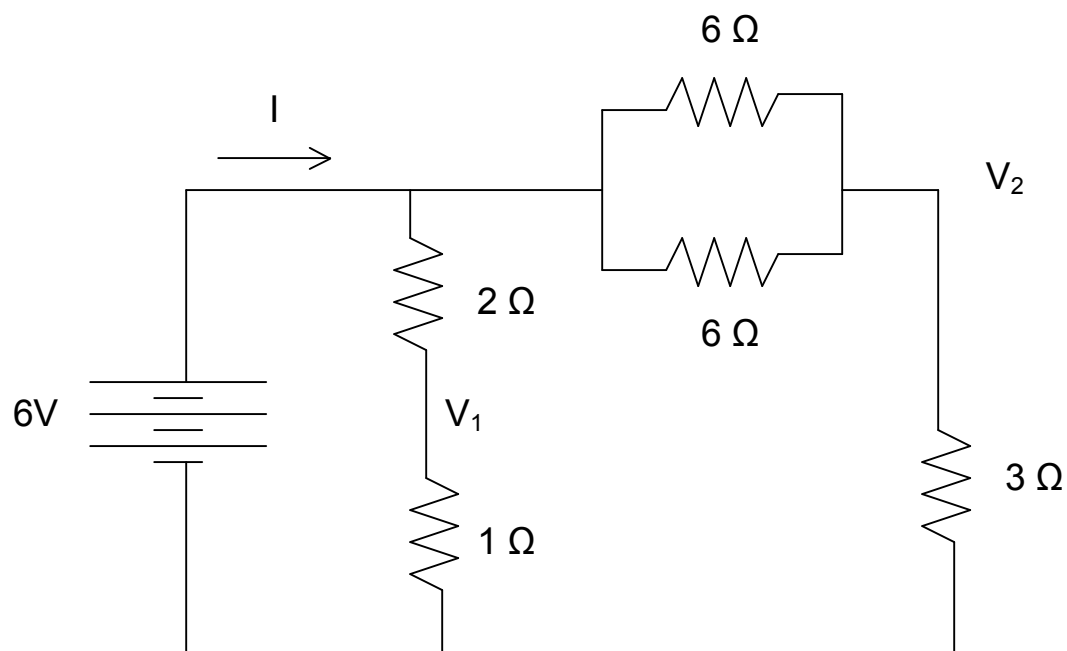
a) How much work does Daljit do to pull her brother up the hill? (2)

b) What is the efficiency of the sled moving along the snow, up the hill? (4)

c) What is one possible place that the rest of the energy might go? (1)

4. Mechanical waves can affect structures, society and the environment in positive and negative ways. Discuss an instance of how mechanical waves have negatively impacted one of these areas and assess ways of reducing the negative effects. Identify a technology that uses mechanical waves within one of the listed areas and highlight the ways in which it provides benefit. (4)

5. a) Determine the values for V_1 , V_2 and I in the following circuit: (7)



b) Calculate the power consumed by this circuit. (2)